

CLAIMS

What is claimed is:

1. A glass composition comprising, in mol%, 1-10% MO where M is selected from Ba, Sr, Ca and mixtures thereof, 5-30% MgO, 0.3-5%
5 CuO, 0-2.5% P₂O₅, 0-2.5% ZrO₂, 24-45% ZnO, 2-10% Al₂O₃, 35-50% SiO₂ and 0.1-3% A₂O where A is selected from the group of alkali elements and mixtures thereof.
2. A thick film composition comprising a dispersion of finely
10 divided solids comprising:
 - (a) glass composition as in Claim 1; and
 - (b) organic medium.
3. The thick film composition of Claim 2 further comprising
15 ceramic filler.
4. The thick film composition of Claim 3 wherein said ceramic filler comprises up to 17 wt. % of the total composition.
- 20 5. The thick film composition as in any one of Claims 2, 3, or 4, wherein said glass composition comprises 43-85 wt. % of the total composition.
- 25 6. The thick film composition as in any one of Claims 2, 3, or 4, wherein said organic medium comprises 15-40 wt. % of the total composition.
7. The thick film composition of Claim 2 wherein the ceramic
30 filler is selected from Al₂O₃, ZrO₂, SiO₂, TiO₂, BaTiO₃, cordierite, mullite, and mixtures thereof.
8. A method of forming a multilayer circuit comprising the steps:
 - (a) providing an Aluminum nitride substrate;
 - (b) depositing the composition of any one of Claims 2-7
35 on said substrate;
 - (c) firing said composition and substrate forming an aluminum nitride article;
 - (d) providing a metallic conductive composition;

- (e) depositing said conductive composition on said aluminum nitride article; and
- (f) firing said aluminum nitrate article and said conductive composition.

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9. A multilayer circuit formed by the method of Claim 8.

10. An article comprising the thick film composition of any one of Claims 2-7, wherein said thick film composition is processed to volatilize
10 the organic polymeric binder and sinter the glass composition.

11. A multilayer circuit comprising a plurality of internal thick film metallic conductive composition layers separated by layers of the thick film composition of any one of Claims 2-7, wherein the thick film composition is
15 processed to volatilize the organic polymeric binder and sinter the glass composition.

12. The multilayer circuit of any one of Claims 9 or 11, wherein said metallic conductive composition comprises Ag.

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13. The multilayer circuit of any one of Claims 9 or 11, wherein said metallic conductive composition comprises Au.

14. The method of forming a green tape by casting a layer of the thick film composition of and one of Claims 2, 3, or 7 onto a flexible substrate and heating the cast layer to remove the volatile organic solvent therefrom.

15. A method of forming a green tape by casting a thin layer of the dispersion of any one of Claims 2, 3, or 7 onto a flexible substrate, heating the cast layer to remove the volatile organic solvent therefrom and separating the solvent-free layer from the substrate.

16. A method of forming a multilayer interconnection comprising
35 the steps of:

- (a) forming a patterned array of vias in a plurality of layers of green tape made by the process of Claim 15;

- 5 (b) filling said vias in the green tape layer(s) of step (a) with a thick film conductor composition;
- (c) printing at least one patterned thick film functional layer over a surface of each of the via-filled green tape layers of step (b)'
- (d) laminating the printed green tape layers of step (c) to form an assemblage comprising a plurality of interconnected functional layers separated by unfired green tape; and
- 10 (e) cofiring the assemblage of step (d).
17. The green tape formed by the method of any one of Claims 14 or 15.
- 15 18. The multilayer interconnection formed by the method of Claim 16.